The Profitability of Islamic banking in Sudan

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Abstract

We investigate the possible profitability determinants by employing the dataset comprised by 27 Sudanese banks from 2005 and 2013. Our contribution to the literature is that we examine the following three models of finance specific to Islamic banking performance: (a) Profit and Loss Sharing, (b) Non-profit and Loss Sharing and (c) Salam mode of finance. We find that ownership, capitalisation and asset utilisation have a positive impact on return on assets (ROA) while operation efficiency, bank age, leverage and specialisation bring an adverse impact. Our empirical evidence also indicates that the Profit and Loss Sharing mode of finance (PLS), one of the financial products provided by Islamic banking only, brings a positive impact on both financial performance indicators: return on assets (ROA) and return on equity (ROE).

Keywords: Profitability determinants, Banking performance, Sudanese Islamic banks.

1. Introduction

Islamic finance has become one of the fastest growing sectors in the worldwide financial industries since the last decade. For instance, after the latest financial crisis 2007-2009, Islamic finance has an average annual growth of 15% to 20% (Weill, 2010 and Othman, 2013). Sharia-compliant products increased from US$450 billion in 2006 to beyond US$1 trillion in 2010. It has also been estimated that the assets under Islamic management have grown from US$150 billion in the mid-1990s to US$700 billion in 2007 (Othman, 2013). Iqbal and Llewellyn (2002) report that the steady growth and expansion of Islamic banking has been witnessed since the first generation of Islamic banks was established in the Middle East. This development takes three forms. The first one has been seen in the foundation of Islamic Banks worldwide, even in non-Muslim countries, including the USA and Europe (Siddiqui, 2008). The second form of expansion is seen as a full conversion to the entire Islamic financial system in two of Muslim countries. This expansion includes Iran, and Sudan (Iqbal and Llewellyn, 2002). Finally, several established conventional institutions have realised the profitable prospect of the Islamic financial market and taken practical actions by investing in Islamic financial windows (Solé, 2007 and Othman, 2013). Therefore, Islamic banks nowadays serve both Muslim and non-Muslim financial systems and customers. This paper aims to shed light on the profitability determinants of Islamic banking in Sudan. Bearing in mind that sustainable profitability is vital in maintaining the stability of the banking system (Flamini *et al*., 2009; Javaid *et al*., 2011), this paper is an attempt to identify the profitability determinants of Sudanese Islamic Banks in order to establish a practical overview of the main performance determinants of these institutions.

Since Sudan's independence in 1956, the Sudanese Banking Industry has passed through many phases. The first phase was the transformation from a traditional banking system to a dual banking system, which included a traditional and Islamic banking. The final stage saw the transformation to a total Islamic banking, which involved a complete adherence to pure Islamic finance rules, and thus making Sudan become one of only two countries in the world to adopt such a system, while Iran has been the other. The country has also witnessed a civil war, which has exhausted the Sudanese economy for more than two decades and ended with the secession of some of the southern parts of the country from the north in 2011. Recent years also witnessed the discovery and production of oil in Sudan, which is considered to be a significant boost to the economy. All these transformations and events justify the importance of studying the performance of Sudanese banks (Ahmed, 2007; Ahmed, 2008).

In this study, we examine the possible factors that determine the profitability of Sudanese Islamic Banks with a sample period ranged from 2005 to 2013. Although data availability prior 2005 is limited, the period of 2005-2013 provides a solid data set to perform the required analysis and achieve reliable results. We also investigate the relationship between Sundanese banking profitability and Salam mode of finance to find out whether the banking industry in Sudan is well positioned to play a major role in enhancing the agriculture industry.

2. Islamic Banking

The term Islamic banking refers to a full set of banking operations by Islamic principles. Kouser et al. (2011) define Islamic banks as "a complete system based on Islamic rules of financing". Another definition of the system was by Ali and Farrukh (2013) who reports that Islamic banking system refers to "*a conduct of banking operation in consonance with Islamic teachings*". Although these definitions have introduced an Islamic banking system regarding its operating principles, rules and products, it lacks the important component of land regulation. The definition does not consider where the Islamic banks trade (which may have rules they may have to abide by). The land law component was considered when Ebrahim and Joo (2001) gave a more comprehensive definition in which they report that "*an Islamic bank is one that by its own choice opts to comply with two sets of law: the law of the Land (Jurisdiction); and the Islamic Law (Sharia)".* Therefore, Islamic banks need to reconcile their positions to coordinate between the possible conflicts that can appear when having some lands in non-Islamic law countries. All the definitions mentioned above agree that the uniqueness of Islamic banking system lies in their objectives.

The rationale behind the importance of Islamic banks comes from the prohibitions of any interest within *Sharia* law, regardless of its rates and time of charge (Ariff, 1988; Ali and Farrukh, 2013). The rationale behind financial systems, whether they are conventional or Islamic, is to utilise the resources in an optimal method, through directing or redirecting these recourses to different investment projects, to attain profit maximisation. Nevertheless, the core rationales which rule the Islamic financial system is not solely profit-maximization. Profitability is neither the only nor the decisive factor of the theory for Islamic finance. Derbel et al. (2011) document that Sharia rules, which governs Islamic finance, is characterised by an integrated and comprehensive framework that direct an economic, social and political life.

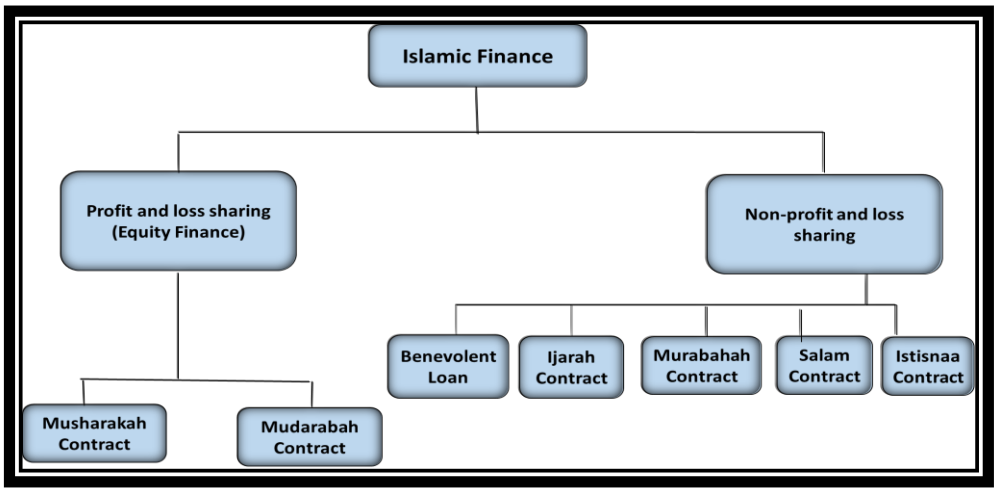
2.1 The Main Principles of Islamic Finance

The main principles of Islamic finance are founded by both Sharia and other jurisprudence or rulings issued by qualified Muslim scholars. These major principles are risk sharing, as well as the prohibition of interest (known as Riba), activities with an element of uncertainty (Gharar**)**, gambling (Maisir**)** activities and the production and sale of goods and services that are forbidden in Islam.

Here, we explain the Profit and Loss Sharing mode of finance further (PLS). The wisdom behind this principal is discussed by Mollah et al., (2016) who reports that conventional financial contract

transfers all the risks related to an investment to one stakeholder through the predetermined rate of interest. On the contrary, Islamic financial philosophy believes in profit and loss sharing (PLS) method of finance (Beck et al., 2010; Mollah et al., 2016). This method is presented in Mudarabah (trust-finance) and Musharakah (joint-venture) as an alternative to predetermined interest. According to PLS modes of finance, a sharing plan must be established at the signing of an agreement to specify the percentage of distribution of expected profit or loss. This unfairness can be averted if banks agree to accept PLS as a mode of finance and also allow a sizable amount of fund to borrowers on the same basis. In practice, PLS has been criticised for showing insufficiency.

There are other modes of Islamic finance (Non-profit and Loss Sharing) such as Murabaha (cost plus profit mark-up), Salam (advance purchase or sales contract) and Ijara (lease) which represent the group of fixed charges or mark-up. Finally, the mode of Qard Hassan (benevolent loan) is the only mode of free of charge principle. The structure of the Islamic modes of finance is illustrated in figure 1. Mollah et al., (2016) report that using such modes of finance make Islamic banks less exposed to insolvency risk and external shocks, compared to conventional banks. gure 1: Structure of Islamic Finance



Source: created by the authors

2.2 Islamic Banks' Sources of Funds

As in conventional banks, Islamic banks have two sources of funds; internal and external. ***The internal source*** is the shareholders' funds. Shareholders' fund is the single source of equity finance

that an Islamic bank uses. Unlike conventional banks, Islamic banks do not issue preference shares as it requires predetermination of fixed dividends for their holders (Deehani, 1999).

External sources of funds consist of current accounts (demand deposit), saving accounts and investment deposit. A customer who holds current accounts in Islamic banks is supposed to sign an agreement with the bank under which they give their clear endorsement to the bank to use their funds, with no return (Khan and Mirakhor, 1990; Bashir, 1999 and 2003). Any profits obtained from the deposits of the current accounts will be taken by the shareholders. In contrast, they emphasise that in the case of loss shareholders pay the customers of current accounts from their equity. Islamic banks accept saving deposits from customers under the condition of authorising the bank to utilise the deposit at the bank's own risk. Investment account considers the depositors as investors, who are entitled to receive profit through their investment deposits. Khan and Mirakhor (1990) and Deehani (1999) explain this source of the fund by describing it as neither liability as current account deposit nor equity finance. As an alternative, it represents a unique source of the fund but with a predetermined maturity date that gives the Islamic bank the right to group this money in one pool with its equity and invest it for their contributors with the promise of sharing future profit or loss at pre-agreed proportions. As the investment accounts owner are not guaranteed a predetermined return, they are permitted to receive profit depending on the profitability of the accounting period.

3. Literature Review

Empirical Studies on the determinants of profitability within the banking industry are numerous. Some of them are country-specific, and few of them focus on a panel of countries. A small number of studies has been carried out on the comparisons of profitability determinants between Islamic and conventional banks. In this section, we start with a brief overview particularly focusing on Islamic banking literature. After that, we aim to find out the potential determinants of the profit for the Sudanese banks by reviewing the relevant previous studies.

Karim et al. (2010) report that previous studies emphasising only on Islamic banking profitability are not numerous, but they can still be found in the literature. Ramadan (2011) investigates Jordanian Islamic banks from 2000 to 2010 and shows that well-efficient management, higher credit risk and capital adequacy lead to higher return on assets and profit margin. Bashir (2003) focuses on 14 Islamic Banks from 8 Middle Eastern Countries during 1993 to 1998 and concludes that there is a positive relationship between profitability and short-term funding, capitalisation, loan ratios and overhead expenses. Noor and Ahmad (2011) investigate 78 Islamic banks in 25 countries during 1992 to 2009and find that the operating expenses and equity have a positive and significant effect on the financial performance of Islamic banks. Alkassim (2005) examines the Islamic and Conventional banks in GCC countries between 1997 and 2004 and conclude that there is a positive relationship between bank size and the profitability of Islamic banks, whereas a negative relationship for Conventional banks. Srairi (2010) assesses some Islamic and conventional banks in the Gulf Cooperation Council over the period 1999-2007 and finds that credit brings a positive impact on profitability for Islamic banks, but has a negative influence on conventional banks' profitability.

In the following section of literature review, we try to identify the possible factors which can determine the profitability in the Sudanese banking by examining the relevant studies across conventional and Islamic banking literature.

3.1 Literature on Profitability Measures

Traditionally, two ratios are mostly used in assessing a bank's overall performance: ROA and ROE. For instance, Heffernan and Fu (2010) use ROA, ROE and net interest margin (NIM) as a measure of performance of Chinese banks during 1999 and 2006. These ratios are considered by many authors (Al-Tamimi, 2005; Heffernan and Fu, 2010; Alper and Anbar, 2011) as the best measures of a bank's overall performance as they echo banks capability to achieve a return from its total operations on

funds supplied by shareholders. Some studies utilise other performance measures such as net interest margin (NIM) and Return on Capital (ROC) as measures of financial performance (Naceur, 2003; Alkassim, 2005; Ben Naceur and Goaied, 2008; Heffernan and Fu, 2010). However, as Islamic Banks are interest-free banks, net interest margin (NIM) is excluded in this study: NIM reflects the difference between interest income and interest expense as a percentage of total assets.

3.2 Literature about Profitability Determinants

We discuss these factors which may determine the profitability in the Sudanese banking individually.

3.2.1 Liquidity

Liquidity holding maybe seen as an expense to the bank and will normally be associated with lower rates of profitability. In the Islamic banking context, Haron (1996) reports that like conventional banks, Islamic banks need to balance between their profit maximisation and meeting their obligation whenever it is requested so as not to be exposed to liquidity problems. Samad (2004) and Ramadan (2011) define liquidity as cash availability. Samad and Hassan (2000) document that banks can experience liquidity problem when current and savings accounts are withdrawn at an extensive rate than new deposits at any point time. Al-Omar and Al-Mutairi (2008) and Ramadan (2011) agree that keeping higher liquid assets lessens the ability of banks to produce a profit.

3.2.2 Capitalization

Capitalization is an important factor in explaining the performance of financial institutions. Bank's capital is extensively used to analyse the grade of its internal financial strength and the general strength of a bank. In this respect, Sufian and Parman (2009) argue that firm's capital acts as a cushion that protects depositors in case of loss or liquidation. Similarly, Sangmi and Nazir (2010) note that high capitalisation can aid firms to lend in high risk but profitable areas as well as in opening new branches. This has also been agreed to by Bashir (1999) who remark that capitalization, in general, represents financial collateral and hence reduces the consequences of unfavourable selection.

According to conventional banking theory, a higher equity-to-total assets ratio is linked with a lower profitability (Dietrich and Wanzenried, 2009). This theory is justified by the view that a higher equity ratio normally reduces the equity's risk (Berger and Ofekb, 1995; Bashir, 2003; Karim et al., 2010). As such, the estimated return on equity required by investors is expected to be lessened (since high risk is correlated with high profitability). The nature of the negative relationship between

capitalisation and profitability in banks was further discussed by Berger (1995) and Lee (2012). They document that lower capital ratio is correlated with higher risk exposure, and when the higher risk is effective, that it leads to higher profitability. In essence, this study shows that there is a negative relationship between capital ratio and banks' profitability.

Studies investigating the association between capitalisation and profitability such as Bourke (1989), Molynuex and Thorton (1992), Berger (1995), Kunt and Huizingua (1998) and Athanasoglou, et al., (2005) establish the presence of a positive impact of capital adequacy on profitability. Nevertheless, Guru et al., (2002) find evidence of a negative relationship between profitability and capitalisation of commercial banks in Malaysia.

In the context of Islamic banking Haron (1996) suggests that there is a strong chance that the amount of capital issued by an Islamic bank does not affect its profitability. Firstly, there is no predetermined rate of returns given to the depositors or investors as is the case for the traditional banks. It is well known that Islamic banks offer savings and investment account facilities by *Mudarabah,* which implies that depositors share with the bank any profit or losses deriving from business operations. Consequently, in the case of a loss, depositors will also have to tolerate losses as their money will not be repaid by the bank. This means that there is a mechanical correction effect during periods of financial depression. Secondly, Islamic banks use two methods to set up their investments with depositors' funds. The first method is that the bank pool depositors' and shareholders' funds to invest in a particular business. Profits or losses should be distributed between depositors and shareholders between the bank and the investor according to the business contract. The second method applies when the bank uses depositors' fund solely to finance a particular business. In this case, returns from a project will go directly into a depositor's account, and the bank gains profit from the fee which is applied as an equivalent to the project management costs. Bearing in mind that conventional banks normally merge both shareholders' capital and depositors' funds, one could recognise the irrelevant of the capital and profitability related to the Islamic banking system. This argument is supported by the finding of Ali et al. (2011) who provides evidence of an insignificant relationship between capitalisation and profitability of Islamic banks in Pakistan. However, it is contradicted with the finding of Hassan and Bashir (2003) who suggests a negative relationship between profitability and capitalisation of some Islamic Banks worldwide.

3.2.3 Leverage

Leverage or gearing is closely related to capital. It can be defined according to Guru et al., (2002) as an external source of business finance that a firm can use to improve its financial position and performance. For the Jordanian Islamic Banks, Qudah and Jaradat (2013) find that there is a negative and insignificant relationship between profitability and leverage. Izhar and Asutaya (2007) also established a negative and significant relationship between leverage and profitability in one Indonesian Islamic bank.

Overall, findings of practical studies which examine the relationship between leverage and profitability are ambiguous. Lai and Li (2014) report that leverage, as measured by debt to equity ratio, indicates whether a firm has the capital structure that can withstand any unexpected financial shock by holding a sufficient capital. Molyneux and Thornton (1992), Goddard et al. (2004), and Al-Tamimi (2005) suggest there is a positive relationship between leverage and profitability in traditional banks. Ali et al. (2011) and Javaid et al. (2011) remark that there is no significant relationship between leverage and profitability.

3.2.4 Credit Risk

Athanasoglou et al., (2008) and Ramadan (2011) define credit risk as the chance of losing all or part of the interest, loan asset or both. Ramadan (2011) reports that credit risk often originates from poorness of assets quality and possibly could lead to insolvency of financial institutions. Hassan and Bashir (2003) report that asset quality relies heavily on the quality of credit assessment, monitoring and collection within each bank. Ali et al. (2011) explain that banks, who are involved in borrowing and lending activities, need to create a loan loss provisions to lessen the risk.

3.2.5 Operating Expenses or Management Efficiency

The literature argues that reduced expenses enhance the profitability of a financial institution, leading to a negative association between the operating expenses and profitability (Bourke, 1989). In this context, Srairi (2010) argue that inefficiency related to this aspect could be linked to the bank size, as smaller size assets make the bank unable to benefit from economies of scale. On the contrary, Molyneux and Thornton (1992) prove that operating expense are positively impacting the profitability of European banking sector. Ramadan (2011) explains that the positive relationship between expenses and profitability arises from the fact that banks can transfer such expenses to the customers.

3.2.6 Overhead Expenses

Bourke (1989) claims a negative relationship between overhead expenses and profitability because efficient banks are expected to operate at lower costs. On the other hand, Molyneux and Thornton (1992) support a positive association between overhead expenses and profitability. The supporters of this view claim that these banks can transfer their overheads to users' financial services. In the similar context, Al-Omar and Al-Mutairi (2008) argue that staff cost may positively relate to profitability as banks with higher paid staff expenses may benefit from superior quality. Further opinion on this determinant has been given by Hassan and Bashir (2003) who report that the utilisation of new electronic technology, such as ATMs and another automated method of services delivery, have caused overhead expenses to fall. Consequently, lower overhead expenses may impact performance positively.

3.2.7 Assets Utilisation

Assets utilisation measures how capable and optimal a firm's management uses its resources (Ramadan, 2011). Concerning the nature of the relationship between assets utilisation and profitability, it is commonly agreed that it is positive (Atemnkenf and Joseph, 2006; Bourke, 1989). This is due to the reason that right level of assets utilisation enables financial institutions to improve and expand their investment. Vijayakumar (2012) reports that asset utilisation ratios are particularly important for serving two stated objectives. Firstly, it reflects an overview of internal monitoring, concerning performance over multiple periods. Secondly, it gives an early warning or acts as a yardstick for the sensibility of the conclusions that may be reached on operational results. However, Lai and Li (2014) find that there is an insignificant relationship between assets utilisation and profitability, which imply that high profits earned by the banks do not represent higher assets utilisation.

3.2.8 Bank Size

One of the essential questions related to bank policy is regarding which size is optimal for bank profitability. Although the results of the studies on the relation between bank's size and profitability are conflicting, the effect of an increasing size on profitability has commonly been confirmed to be positive to a certain extent (Short, 1979; Alkassim, 2005; Flamini et al., 2009). Evidence from previous studies such as Naceur (2003) and Athanasoglou et al., (2008) stands for negative relation between bank size and profitability. They prove that big banks have very limited economies of scale

advantage[1], as enlarging the bank size usually leads to limited cost reduction. Athanasoglou (2005) and Athanasoglou et al. (2008) propose that the effect of size could be negative due to bureaucratic and other reasons.

Heffernan and Fu (2010) document that small profitable banks exist. The excel of small size banks has also been justified by Beck and Kunt (2006), who argue that in the lack of well-developed financial markets and legal systems, it becomes more difficult for financial organisations to expand to their optimal size. Another explanation which makes smaller banks more profitable is given by Atemnkenf and Joseph (2006), who report that smaller banks are easy to manage regarding control and coordination.

Although this diversification could make the Islamic banks more vulnerable to both financial and the operational risks, Bashir (1999) document that larger banks are expected to challenge both types of risks, as size is expanded and profitability is increased.

3.2.9 Bank Type

The effect of bank type on performance is viewed from two perspectives: ownership and specialisation. Studies that focus on the relationship between bank ownership and profitability are conducted either with focus on state, private or foreign ownership. Examples of such studies include Short (1979), Bourke (1989), Molyneux and Thornton (1992) and Haron (2004). Studies that focus on the impact of bank specialisation on bank profitability are rare, but they can still be seen in Maudos et al., (2002), Naceur and Goaied (2008) and Heffernan and Fu (2010). According to studies on the relationship between ownership and profitability, two firms may differ in their financial performance depending on whether most of the stake in business is held by the government, private individuals or mutual funds. In the traditional banking context, Flamini et al., (2009) report that due to government commitment, public banks may have objectives other than profit maximisation. This has also been supported by Athanasoglou et al. (2005) who argue that public banks' low level of profitability is because of the banks' social mandate, which differs from profit maximising. Therefore, privately owned banks may excel over state-owned, with regards profitability.

1 Economies of scale are commonly defined as reductions in the cost per unit of a product being manufactured and sold (Haron, 1996).

Iannotta et al. (2006) establish that despite their lower cost, government-owned banks achieve a lower profitability than privately-owned banks. Short (1979) suggests state-owned banks are less profitable than their privately-owned counterparts because government banks are non-profit oriented banks. Micco et al. (2007) finding show it is not a fact that state-owned banks are less profitable than private banks. Their findings are in line with Altunbas et al. (2001) who prove that, in the case of Germany, there is no evidence that privately owned banks are more efficient than public and mutual banks. Meanwhile, Molyneux and Thornton (1992) suggest that state-owned European banks generate significantly higher profitability than their private counterpart.

Turning to the second strand of literature on bank type, which focuses on the impact of specialisation on bank performance, Maudos et al. (2002) believe that specialised banks have the requirement to excel in the industry in which they operate. They justify their opinion since specialised banks can benefit from their financial production or their better market power of pricing resulting from its productive specialisation. In contrast, Heffernan and Fu (2010) report that specialised banks may lose profit opportunity because of their limited areas of investment.

3.2.10 Bank Age

Findings on the impact of bank age on the financial performance of banks are contradicting. Aburime (2008) reports that newly founded banks are not operationally profitable in the first few years after their establishment. Beck et al. (2005) and Beck and Kunt (2006) report another reason for the excellence of old age banks over the newcomers. They claim that due to their experience, the longer established bank seems to be more able to enjoy higher performance and good reputation advantages over the comparatively newly formed bank. However, their empirical results for the Nigerian market prove that older banks are financially less profitable as newcomers prove their ability to engage in new profit opportunities. Dietrich and Wanzenried (2009) document that bank age does not have a significant impact on the profitability of banks located in Switzerland. They show that newly founded banks, if well established, can efficiently create new profit opportunities.

3.2.11 Commitment to PLS versus non-PLS

As has been mentioned in the previous chapter, Islamic modes of finance can be divided into PLS and/ or non-PLS modes of finance. Samad and Hassan (2000) establish that PLS modes of finance are less profitable and not popular in Malaysian Islamic banking when compared with the alternative modes of financing which are found to be more profitable and less risky than Mudharabah and

Musharakah. Additionally, Haron (1996) and Haron and Azmia (2004) prove that funds invested in PLS modes of finance have an inverse relationship with profitability. Haron (2004) suggests that increase in these modes of finance will not generate immediate returns to the bank as the calculation of profit usually takes place either upon completion of a project or after a one-year period from the start point. Consequently, any increase in the PLS investments is instantly followed by a reduction in profitability.

Turning to non-PLS, present in Morabahah, Haron (2004) prove a positive but insignificant relationship between Morabahah and Islamic banks profitability. Haron (2004) reports that Islamic banks concentrate their financing activities in Morabahah. As this mode of financing is short-term, it produces less profit compared to long-term investment. Consequently, any increased amount of Morabahah investment will not increase Islamic banks profitability.

3.2.12 Commitment to the agricultural sector (Salam)

Salam is an advance contract of purchasing agricultural production. Using the case of the Pakistan banking sector, Kaleem and Wajid (2009) explore the possible application of Salam as an alternative source of agriculture financing under Islamic banking in Pakistan. Kaleem and Wajid (2009) find that none of the financial institutions in Pakistan offers Salam mode of finance to their customers although about 70 percent of farmers need money for purchasing crops inputs, paying for labour and renting machinery. Overall, Islamic banks must take extraordinary care when dealing in Salam operations as they may face some risks. Firstly, Counterparty Risk is a common risk in this type of finance as the client may default after taking the payment in advance. Secondly, at the time the goods are received by the bank, the price may become lower than the expected price, creating commodity price risk. Thirdly, sometimes the quality of delivered commodity is not of desired quality, which makes it inadmissible for the prospective buyer. Fourth, the bank may not be able to sell the goods at the right time, leading to locking funds in the goods until they are sold, entailing possible extra storage expenses. To avoid or manage the risks mentioned above, banks need to be extra cautious when signing any contract of Salam. Such caution mean entering in Salam only when goods have decent market potential. Also, the policy of penalty charges to the supplier could be applied in the case of delayed delivery, to protect the bank from a late delivery cost.

4. Research Design

In this section, our task is to establish a research design to identify possible determinants which have impacts on Sudanese banking performances. In this study, our estimating equations have been developed based on our previous literature review. By adding the Islamic finance models, we have modified the theoretical model to better accommodate the Islamic banking sector in Sudan. Our research design is comprised of the following two estimating equations.

Firstly, we provide a full set of variables and their measures in Table 1.

Table 1: Variables, Measures and Notions

Variable name	Measure	Notion
Return on Assets	Net profit to Total Assets	ROA
Return on Equity	Net profit to Total Equity	ROE
Bank Type	Dummy Variable. We assume that private bank=1; state bank=0	Type
Bank Age	years	Age
Specialisation	Dummy Variable. We assume that specialised bank=1; non-specialised bank=0	Specialised
Size	Dummy Variable	Totass
Capitalisation	Total Equity to Total Assets	Capad1
Liquidity	Current Assets to Current Liability	Liq2
Credit Risk	Loan Loss Provision to Total Loan	Credr1
Leverage	Total Liability to Total assets	Lever2
Operational efficiency	Total Cost to Total Income	Mgt1
Staff expenses	Overhead to Total expenses	Over2
Assets Utilisation	Operating Income to Total Assets	Assut1
Profit and Loss Sharing	Musharakah and Modarabah to Total modes of finance	PLS
Non-Profit and Loss Sharing	Morabahah to Total Modes of Finance	Murab
Salam	Salam to Total Modes of Finance	SLM

The ROA and ROE are used as bank performance indicators. Although there are other profitability measures, such as net interest margin or return on capital, because they are not applicable to Islamic banking industry. We employ the following factors as our possible determinant of bank performance including the banks' age, size and type, as measured by ownership and specialisation. Furthermore, bank capital, liquidity, credit risk, leverage, operational efficiency, staff expenses, and assets utilisation are also used as explanatory variables. With regards to the unique features of Islamic

banking, we include profit and loss sharing (Modarabah and Mosharkah), non-profit and loss sharing (Morabahah) and Salam mode of finance into these equations. Our primary two equations are described as follows

In Eq. 1, ROA is defined as the explained variable –

$$Bank\ ROA_{it} = \alpha + \beta Type_{it} + \beta Age_{it} + \beta Specialised_{it} + \beta Totass_{it} + \beta Capad1_{it} + \beta Liq2_{it} + \beta Credr1_{it} + \beta Lever2_{it} + \beta Over2_{it} + Mgt1 + \beta Assut1_{it} + \beta PLS_{it} + \beta Murabit + \beta SLM_{it} + u_{it} \quad \text{(Eq. 1)}$$

In Eq.2, ROE is defined as the explained variable –

$$Bank\ ROE_{it} = \alpha + \beta Type_{it} + \beta Age_{it} + \beta Specialised_{it} + \beta Totass_{it} + \beta Capad1_{it} + \beta Liq2_{it} + \beta Credr1_{it} + \beta Lever2_{it} + \beta Over2_{it} + Mgt1 + \beta Assut1_{it} + \beta PLS_{it} + \beta Murabit + \beta SLM_{it} + u_{it} \quad \text{(Eq.2)}$$

In addition to these two above equations, we also carry out the robustness checks by adopting the different measurements for the following indicators. They are (a) liquidity: 2 measurements (b) credit risk: 3 measurements (c) leverage: 2 measurements and (d) overhead expenses: 2 measurements). More detailed information for these measurements and all empirical results are shown in our Appendix 2 and Appendix 3.

5. Data and Empirical Results

5.1 Data Sources and econometric procedures

This study uses secondary data sourced from twenty-seven Sudanese Islamic banks' financial statements, particularly the balance sheet and the profit and loss statement, during the period from 2005 to 2013. The sample represents the major Sudanese banks that have consistently published their financial statements over the study period. This data was collected either from the bank websites or as hard-copies directly from the banks' headquarters and branches. In this study, we focus on the local private/state bank only. We show detailed information about these twenty-seven sample banks in Appendix 1. Given that foreign banks operating in Sudan are under no obligation to publish their financial statements, our sample comprises of locally state and privately-owned banks.

To analyse our data set, firstly we employ the likelihood ratio test to check whether we can carry out the pool regressions. After that, we apply the Hausman test to decide whether the fixed effects model or random effects model should be employed. If the null hypothesis of the Hausman test is accepted, the random-effects model suits our panel data better. All our empirical tests went through these econometric procedures. Overall, we find that most of our empirical analyses can be generated by using the panel least squares. Table 2 summarises the descriptive statistics for our key variables in this study.

Table 2 Descriptive Statistics of Explained and Explanatory Variables for all Sudanese Islamic Banks

Variable Name	Mean	Std. Dev.	Max	Min	No of Obs.
Return on Assets	0.0267	0.0346	0.3141	-0.0896	186
Return on Equity	0.8745	5.5230	57.1907	-0.6215	185
Bank Type	0.6720	0.4707	1.0000	0.0000	186
Bank Age	6.9624	0.6687	8.0000	6.0000	186
Specialisation	4.1901	1.1254	5.0000	2.0000	424
Size	1.3400	1.6621	9.17E+09	46978	186
Capitalisation	0.2262	0.1880	1.0000	0.0000	186
Liquidity	1.9632	1.3653	15.250	1.0033	185
Credit Risk	0.0621	0.0741	0.4072	0.0000	186
Leverage	0.5723	0.1915	0.9799	0.0000	186

Operational efficiency	0.6877	0.2966	2.7849	0.0983	186
Staff expenses	0.4253	0.1565	1.0738	0.0000	186
Assets Utilisation	0.0804	0.0339	0.3619	0.0252	186
Profit and Loss Sharing	0.3728	0.3242	1.0000	0.0000	172
Non-Profit and Loss Sharing	0.4525	0.2866	1.0000	0.0000	172
Salam	0.0165	0.0402	0.3074	0.0000	172

Source: Calculated by the author.

5.2 Discussion of Results

Our major empirical results for Equation (1) and Equation (2) are presented in Table 3. Furthermore, for consistency and robustness, we estimate the following four variables (a) liquidity, (b) credit risk, (c) leverage and (d) staff expenses, with more than just one financial indicator. For instance, we adopt two liquidity ratios: current ratio and quick ratio representing the variable of liquidity. More empirical results generated from these two original equations are shown in Appendix 2 and 3.

Overall, our empirical results seem to be consistent and provide supporting evidence to confirm our findings presented in table 3.

Table 3: Estimated Coefficient and their signs for the entire sample

Explanatory Variables	Return on Assets (ROA)	Return on Equity (ROE)
Constant	0.1416*** (0.0282)	-8.1045 (10.246)
Bank Age (Age)	-0.0087 *** (0.0027)	0.2158 (0.9742)
Bank Type (Type)	0.0250*** (0.0078)	-1.8078 (2.8324)
Specialisation (Specialised)	-0.0105*** (0.0033)	1.1569 (1.2056)
Size (totass)	-1.21E-12 (1.14E-12)	4.95E-11 (4.14E-10)
Capitalisation (Capad1)	0.0191* (0.0116)	0.9854 (4.1986)
Liquidity (Liq2)	-0.0021 (0.0014)	0.0256 (0.4978)
Credit risk (Credr1)	0.0015 (0.0209)	-4.1016 (7.6219)
Leverage	-0.0364***	1.7983

(Lever2)	(0.0125)	(4.5465)
Operational efficiency (Mget1)	-0.0454*** (0.0068)	0.6504 (2.4514)
Staff expenses (Over2)	-0.0111 (0.0115)	0.8852 (4.1725)
Assets Utilisation (Assut1)	0.3158*** (0.0693)	5.1231 (25.1601)
Profit and Loss Sharing (PLS)	0.0146* (0.0080)	5.0408* (2.9067)
Salam (SLM)	-0.0143 (0.0334)	-0.9601 (12.1191)
Non- Profit and Loss Sharing (Murab)	0.0017 (0.0085)	-0.3363 (3.1017)
Adjusted R^2	0.6466	0.0087
Number of Observations	162	162

* Numbers without brackets are the coefficients and numbers in brackets are the standard deviations. *, **and *** indicate significance levels of 10%, 5% and 1% respectively.

5.2.1 Findings: about Capitalisation

Table 3 and Appendix 2 (see Model 1- Mode l0) show that capitalisation, as measured by total equity to total assets, has a positive and significant impact on ROA. This relationship reflects the banks' ability to control financial risk exposure and to absorb losses. It also reflects that these banks are characterised by high financial collateral (security) which, according to Bashir (1999) and Sangmi and Nazir (2010), will allow them to enjoy investing in high risk but profitable areas, diversifying their investment (business) through opening of new branches and reducing the consequences of unfavourable selection of investments. Additionally, it means that depositors, creditors and investors of these banks will be protected in the case of loss or liquidation. Our finding is consistent with those by Bourke (1989), Molynuex and Thorton (1992), Athanasoglou et al., (2005) and Flamini et al., (2009), who all prove the positive and significant impact of capitalisation on banks' profitability. In the context of Islamic Banking, positive association between capitalisation and ROA is in line with the finding by Hassan and Bashir (2003), who establish a positive impact of capitalisation on the profitability of the worldwide Islamic Banks during 1994-2001.

Moreover, most of our result in Table 3 and Appendix 3 (see Models 1-7 and Models 9- l1) show that capitalisation has no impact on ROE for these Sundanese banks. This result is consistent with some

previous studies. For instance, our result is in line with Idris et al. (2011), who prove an insignificant association between capitalisation and the profitability of Malaysia Islamic banks. Haron (1996) also suggests that the profitability of an Islamic Bank is not affected by the amount of issued capital.

5.2.2 Findings: about Bank Age

Based on Table 3 and Appendix 2 (see Model 1- Mode l1), we find that the impact of bank age on ROA is statistically significant and brings an adverse impact on ROA. This result can be inferred that the newly established group of banks are more profitable than both old and middle-aged banks. This may imply that newly formed banks can invest in high-profit opportunities. Our finding is consistent with the earlier findings of Beck et al. (2005) and Beck and Kunt (2006). Both studies show that newly established Nigerian banks are financially more profitable the old one, reflecting their ability to engage in new profit opportunities. However, we find that the factor of bank age has no significant impact on ROE of Sudanese banking Industry. Refer to Table 3 and Appendix 3 (see Models 1-7 and Models 9-11).

5.2.3 Findings: about Leverage

According to Table 3 and Appendix 2 (see Model 1- Mode l1), we find that the impact of leverage, as measured by the ratio of debt to equity ratio, is overall statistically significant and negative on ROA. For instance, if the leverage of Sudanese Islamic banks increases by 1%, their profitability will decrease by 3.64% (Refer to Table 3). Accordingly, our result may indicate that the management of Sudanese Islamic banks cannot predict and avoid the risks associated with leverage. Izhar and Asutaya (2007) also have a similar finding showing that a negative and significant relationship between leverage and profitability of Muamalat Islamic bank in Indonesia. However, our results in Table 3 and Appendix 3 (see Model 1- Mode l1, except Model 8) show that the impact of leverage on ROE is found to be insignificant.

5.2.4 Findings: about Bank Type

Our findings on the impact of private-bank type reveal a positive and highly significant relationship between this factor and ROA of Sudanese banks (Refer to the variable of "bank type" in Table 3 and Appendix 2). In this study, we assume that the dummy variable of "bank type" for private banks is 1, while the dummy for state banks is assumed to be zero. This superiority in the performance of private banks may be explained by the excellence of private banks in operational efficiency. Furthermore,

our finding can be justified by the argument of Flamini et al., (2009) and Athanasoglou et al., (2005), who report that as state banks are in charge of public and social commitments, they may have objectives other than profit maximisation.

5.2.5 Findings: about Specialisation

Our results are shown in Table 3 and Appendix 2 (refer to the variable of specialisation) show that there is a significant adverse relationship between specialisation and ROA. We assume that the dummy variable for specialised banks equals to 1. Our result may imply that specialised banks in Sudan bring a negative impact on ROA. This finding may, according to Heffernan and Fu (2010), mean that specialised banks lose profit opportunities due to their limited areas of investment. However, Heffernan and Fu (2010) document that in China, specialised banks are more profitable than non-specialised ones.

5.2.6 Findings: about Overhead Expenses

We find that the impact of overhead to total expenses is statistically insignificant on ROA and ROE (Refer to Table 3, Appendix 2, and Appendix 3). We do not find supporting evidence for findings reported by previous literature (Bourke, 1989; Hassan and Bashir, 2003; Al-Omar and Al-Mutairi, 2008). For instance, Bourke (1989) states that there is a negative relationship between overhead expenses and bank profitability, since efficient banks can operate at lower costs.

5.2.7 Findings: about Bank size

The impact of bank size is found statistically not significant on both ROA and ROE (Refer to Table 3, Appendix 2 and Appendix 3). Our result may imply that the size of a Sudanese Islamic Bank does not affect the amount of profit gained by these banks. The insignificant relationship between bank size and profitability could be related to the effect of the high inflation rate in the Sudanese economy. Such rate minimises the actual value of Sudanese pound and makes the profitability of these banks more related to the quality of investment rather than to the quantity of their assets. No significant relationship between bank size and profitability has been found in the previous studies (Goddard et al., 2004; Athanasoglou et al., 2005; Atemnkenf and Joseph, 2006). They all prove an insignificant association between profitability and bank size. In the Islamic Banking context, this finding is consistent with the results of Ali et al. (2011) and Ramadan (2011), who prove insignificant association exist between bank size and profitability.

5.2.8 Findings: about Credit Risk

Furthermore, credit risk is found to have an insignificant impact on the two measures of profitability (Refer to Table 3, Appendix 2 and Appendix 3). This finding could be interpreted that their investments are heavily biased towards short term trade finance. Therefore, credit risk of Islamic banks contribute modestly to banks profits. This finding could also be related to the nature of Islamic banks, which base their activity on risk sharing with their customers. Our result is in line with the findings by Al-Omar and Al-Mutairi (2008) and Flamini et al. (2009), who prove the insignificant relationship between profitability and credit risk exist.

5.2.9 Findings: about Asset Utilisation

We find that assets utilisation, as measured by total income to total assets, has highly positive and significant impact on ROA (Refer to Table 3 and Appendix 2 Model 1-Model 11). This means that any improvement in the internal monitoring and future planning concerning optimal use of assets will increase the profitability of Sudanese Islamic banks. In the Islamic Banking context, our result is consistent with the empirical result of Srairi (2010) and Ali et al. (2011), which establishes the positive and significant impact of assets utilisation on Islamic Banks' profitability. However, assets utilisation is shown to have an insignificant impact on ROE (Refer to Table 3 and Appendix 3).

5.2.10 Findings: about Operational Efficiency

Our result proves a negative and statistically significant relationship between ROA and the operational efficiency (Refer to Table 3 and Appendix 2 Model 1-Model11). Our finding is in line with Srairi's finding (2010) showing that proves the inverse relationship between profitability and operational efficiency within Gulf Countries' Islamic Banks. Furthermore, the operational efficiency is shown to have an insignificant impact on ROE. See Table 3 and Appendix 3 (Models 1-7 and Models 9-11).

5.2.11 Findings: about Liquidity

Our result shows that there is an insignificant relationship between liquidity and both performance indicators: ROA and ROE (Refer to Table 3, Appendix 2 and Appendix 3). Our finding could be related to the nature of some of the Islamic bank's modes of finance, which requires no cash to proceed the transaction (Morabahah and Modarabah). In the context of Conventional banks, this finding is supported by Guru et al. (2002) and later by Alper and Anbar (2011), who show that there is no

significant impact of liquidity on banks' profitability. In the Islamic Banking context, this finding is in harmony with the result of Idris et al. (2011), who assert that there is an insignificant association between liquidity and profitability of Islamic Banks located in Malaysia.

5.2.12 Findings: about Profit and Loss Sharing Model of Finance

Turning to the profitability determinants of Islamic Banking Industry, we find that Profit and Loss Sharing Model of Finance (PLS) has a significantly positive association with both ROA (Table 3 and Appendix 2, except Model 8) and ROE (Table 3 and Appendix 3, except Models 9 and 11). Our result can be justified by the policy of Central Bank of Sudan, which encourages banks to use the Musharaka mode in financing all economic activities, as well as giving each bank the right to determine the Mudarib's percentage share in the profit based on Central Bank of Sudan Policies in 2010. Such policies make Sudanese Islamic Banks able to benefit from the nature of PLS modes of finance, which gives banks the right to group the money provided by customers in one pool with equity at the pre-agreed proportion of profit or loss sharing.

5.2.13 Findings: about Non - Profit and Loss Sharing Model of Finance

Our result shows that there is an insignificant relationship between Non - Profit and Loss Sharing Model of Finance (non-PLS) and the two banking performance indicators: ROA and ROE (Refer to Table 3, Appendix 2 and Appendix 3). This mode of financing is short-term and therefore less able to produce profit compared to long term investment. Consequently, any increased amount of Morabah investment will not increase Islamic banks profitability.

Overall, our findings suggest that Sudanese Islamic Banks are more committed to PLS modes of finance than non-PLS. This superiority of PLS over non-PLS is likely, according to Samad and Hassan (2000), in an economy where informational asymmetries, resulting from moral hazard, are smaller.

5.2.14 Findings: about Salam model of Finance

Finally, the impact of Salam mode of finance is proved to be insignificant on both the ROA and ROE of Sudanese Islamic Banks (Refer to Table 3, Appendix 2 and Appendix 3). Such findings may relate to the nature of Salam Contract, which is characterised by counter-part default risk. This justification is supported by the fact that the Sudanese economy is characterised by a high inflation rate, which may cause differences between Salam contract price and market price. Such price difference may

encourage default risk among simple farmers. In addition to that, the nature of Salam contract makes it difficult for the bank to specify an accurate, suitable future price as, at the time the goods are received by the bank the price may become lower than the expected price, leading to commodity price risk.

6. Conclusion

This study investigates the relationships between banking profitability and its possible determinants by employing our hand-collected data of 27 Sudanese banks from 2005 to 2013. Findings of this study provide some useful insights on performance determinants to the policymakers and industry leaders, as well as bank managers. Accordingly, those parties could enhance the profitability of Sudanese Islamic Banks by improving capitalisation, assets utilisation, banks operation efficiency, and leverage. The foreign banks in Sudan have no obligation to publish financial results. Because of the lack of the data availability for these foreign banks operating in Sudan, to exclude these foreign banks from our sample is the limitation in this study. Moreover, we cannot use two-stage least squares or GMM estimation because of the small size of the Sudanese banking industry and the large number of explanatory variables in our estimating equation.

Industry leaders and bank managers could also benefit from our findings on Bank Age which suggests that they can learn from the experience of newly established banks, as the latter is shown to be able to utilise their resources to generate more profits.

Findings of this research also reveal that privately owned banks earn higher profits compared to state owned. Accordingly, managers of state banks could benefit from the resource management technique used by private Banks. This seems practically possible as state owned banks face the same local conditions as private Banks.

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Appendix 1

List of the twenty seven Sundanese banks selected for the sample

1. Byblos Bank (Africa)
2. Saudi Sudani
3. Sudanese Islamic Bank
4. Workers National bank
5. Industrial Development Bank
6. AL Nile (Islamic Co -operative)
7. Export development bank
8. Elnilein Bank
9. Farmers Commercial Bank
10. Omdurman National Bank
11. Faisal Islamic Bank
12. Sudanese French Bank
13. Al Shamal Bank
14. Bank of Khartoum
15. Blue Nile Mashreg
16. Real Estate Commercial Bank
17. Al Baraka
18. Al Jazeera Sudanese Jordanian Bank
19. Saving and Social Development Bank
20. Al Salaam Bank
21. National Bank of Sudan
22. Agricultural Bank
23. Financial Investment Bank
24. United Capital Bank
25. Sudanese Egyptian Bank
26. Tadamon Islamic Bank
27. Animal Resource Bank

Appendix 2

Regression analyses on the Impact of Explanatory Variables on ROA of the Entire Sample of Sudanese Islamic Banks– Our Equation (1)

Variables	Measures Substitute	Model (1) **Original Eq. (1)**	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)
Constant		0.1416*** (0.0282)	0.1430*** (0.0027)	0.1434*** (0.0270)	0.1321*** (0.0262)	0.1237*** (0.0210)	0.1134*** (0.0229)	0.1094*** (0.0227)	0.1358 (0.0311)	0.098361 (0.0287)	0.1062 (0.0260)	0.1419 (0.0249)
Bank Age (Age)		-0.0088*** (0.0026)	-0.0087*** (0.0027)	-0.0088*** (0.0026)	-0.0082*** (0.0026)	-0.0075*** (0.0023)	-0.0091*** (0.0025)	-0.0093*** (0.0025)	-0.0079*** (0.0029)	-0.0069*** (0.0028)	-0.006*** (0.0026)	-0.0096*** (0.0026)
Bank Type (Type) The dummy variable for private banks is assumed to be 1.		0.0250*** (0.0077)	0.0248*** (0.0077)	0.0245*** (0.0076)	0.02467*** (0.0074)	0.0265*** (0.0074)	0.0207*** (0.0077)	0.0216*** (0.0077)	0.0227*** (0.0081)	0.0253*** (0.0079)	0.0285*** (0.0079)	0.0232*** (0.0075)
Specialisation (Specialised)		-0.0105*** (0.0033)	-0.0104*** (0.0033)	-0.0104*** (0.0032)	-0.0110*** (0.0031)	-0.0101*** (0.0032)	-0.0086*** (0.0033)	-0.0093*** (0.0033)	-0.009*** (0.0035)	-0.0099*** (0.0033)	-0.0121*** (0.0033)	-0.0100*** (0.0032)
Bank Size (total assets)		-1.21E-12 (1.14E-2)	-1.28E-2 (1.09E-2)	-1.25E-12 (1.09E-12)	-1.11E-12 (1.06E-2)				-1.35E-12 (1.20E-12)	6.84E-13 (1.16E-12)	-8.87E-14 (1.10E-12)	-1.85E-12 (1.14E-12)
Capitalisation (Capad1)		0.0191* (0.0115)	0.0187* (0.0113)	0.01808* (0.0112)	0.0285*** (0.0117)	0.0214** (0.0108)	0.0198* (0.0106)	0.0168* (0.0105)	0.0153* (0.0124)	0.0265*** (0.0112)	0.0280*** (0.0114)	0.0174 (0.0113)
Liquidity	Current ratio	-0.0021 (0.0013)	-0.0022 (0.0014)	-0.0021 (0.0013)		0.0020 (0.0013)	-0.0020 (0.0014)		-0.003 (0.0026)	-0.0015 (0.0014)	0.0001 (0.0011)	-0.0019 (0.0013)
	Quick ratio				-0.0041*** (0.0013)							
Credit risk	LLP/total loan	0.0015 (0.0209)	0.0018 (0.0208)	0.0018 (0.0207)	-0.0076 (0.0206)	0.0033 (0.0207)					0.0123 (0.0215)	0.0065 (0.0206)

	LLP/total Assets								-0.0869 (0.0828)			
	Loan/total Assets									-0.0271*** (0.0090)		
Leverage	Long term liability/total equity	-0.0364*** (0.0125)	-0.0365*** (0.0125)	-0.0368*** (0.0124)	-0.0295*** (0.0100)	-0.0317*** (0.0116)	-0.0476*** (0.0122)	-0.0375*** (0.0098)	-0.0407*** (0.0160)	-0.0452*** (0.0131)		-0.0339*** (0.0123)
	Total deb/ total Assets										-0.0008 (0.0014)	
Operational efficiency (Mget1)		-0.0454*** (0.0067)	-0.0455*** (0.0067)	-0.0455*** (0.0066)	-0.0431*** (0.0065)	-0.0433*** (0.0064)	-0.0336*** (0.00629)	-0.0356*** (0.0061)	-0.0401*** (0.0078)	-0.032*** (0.0063)	-0.0510*** (0.0066)	-0.0366*** (0.0069)
Staff expenses	Overheads/total expense	-0.0112 (0.0114)	-0.01142 (0.0113)	-0.0112 (0.0112)	-0.0107 (0.0110)	-0.0084 (0.0110)	-0.0087 (0.0115)	-0.0097 (0.0115)	-0.0088 (0.0120)	-0.0002 (0.01181)	-0.0109 (0.0118)	
	Overheads/ total Assets											-0.4370*** (0.1663)
Assets Utilisation (Assut1)		0.3158*** (0.0692)	0.3131*** (0.0678)	0.3130*** (0.0675)	0.3263*** (0.0662)	0.3485*** (0.0602)	0.5897*** (0.0501)	0.5900*** (0.0502)	0.3293*** (0.0733)	0.6218*** (0.0534)	0.2938*** (0.0707)	0.3703*** (0.0670)
Profit and Loss Sharing (PLS)		0.0145* (0.0080)	0.0133*** (0.00518)	0.0138*** (0.0050)	0.0133*** (0.0049)	0.0135*** (0.0050)	0.0132*** (0.0046)	0.0139*** (0.0046)	0.0154 (0.0100)	0.0148* (0.0082)	0.0156** (0.0082)	0.0145* (0.0078)
Salam (SLM)		-0.0143 (0.0333)	-0.0151 (0.0330)						-0.0168 (0.0353)	-0.0186 (0.0358)	-0.0177 (0.0343)	-0.0126 (0.0326)
Non- Profit and Loss Sharing (Murab)		0.0016 (0.0085)							-0.0018 (0.0101)	0.0039 (0.009)	0.0027 (0.0087)	0.0005 (0.0083)
Adjusted R^2		0.6466	0.6489	0.6508	0.6651	0.6500	0.7502	0.7489	0.6533	0.0039	0.6270	0.6603

* Numbers without brackets are the coefficients and numbers in brackets are the standard deviations. *, **and *** indicate significance levels of 10%, 5% and 1% respectively.

Appendix 3

Regression analyses on the Impact of Explanatory Variables on ROE of the Entire Sample of Sudanese Islamic Banks – Our Equation (2)

Variables	Variables measures	Model (1) **Original Eq. (2)**	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)	Model (11)
Constant		-8.1045 (10.2463)	-8.3951 (9.8565)	-8.3768 (9.8197)	-8.3783 (9.7414)	-7.3858 (7.6111)	-8.7330 (7.4111)	-8.5503 (7.3269)	1.5626 (0.3130)	-9.7139 (0.3146)	-6.4434 (9.2274)	-9.2634 (0.0249)
Bank Age (Age)		0.2158 (0.974203)	0.2089 (0.9688)	0.4393 (0.962628)	0.21843 (0.9662)	0.13584 (0.8617)	0.3864 (0.820357)	0.3943 (0.8168)	-0.1010*** (0.0292)	0.5579 (0.5554)	0.1099 (0.9340)	0.4393 (0.0025)
Bank Type (Type) The dummy variable for private banks is assumed to be 1.		-1.8078 (2.8324)	-1.7636 (2.7934)	-1.7756 (2.7783)	-1.8172 (2.7672)	-1.8742 (2.7006)	-0.6986 (2.5135)	-0.7408 (2.4962)	0.1190 (0.0817)	-0.5869 (0.8259)	-1.9440 (2.7986)	-1.36961 (0.0075)
Specialisation (Specialised)		1.1569 (1.2055)	1.1391 (1.1903)	1.1407 (1.1861)	1.1577 (1.1724)	1.1688 (1.169294)	0.6888 (1.0914)	0.7198 (1.0760)	-0.0286 (0.0352)	0.6722 (0.5542)	1.2334 (1.1892)	1.0401 (0.0032)
Bank Size (total assets)		4.95E-11 (4.14E-10)	6.22E-11 (3.96E-10)	6.33E-11 (3.95E-10)	6.27E-11 (3.94E-10)				-5.81E-12 (1.20E-11)	7.82E-11 (0.8404)	-1.52E-12 (3.89E-10)	1.79E-10 (1.14E-12)
Capitalisation (Capad1)		0.9852 (4.1985)	1.0653 (4.1195)	1.0332 (4.0777)	1.3286 (4.3410)	0.8635 (3.9254)	-0.1493 (3.4553)	-0.0160 (3.3739)	-0.3053*** (0.1247)	0.0357 (0.9924)	0.6739 (4.0551)	1.2015 (0.0113)
Liquidity	Current ratio	0.0256 (0.4978)	0.0326 (0.4920)	0.0358 (0.4879)		0.0315 (0.4856)	0.0910 (0.4759)		-0.0387 (0.0270)	0.0860 (0.8610)	-0.0849 (0.4118)	-0.0100 (0.0013)
	Quick ratio				-0.0796 (0.5025)							

Credit risk	LLP/total loan	-4.1016 (7.6218)	-4.1694 (7.5707)	-4.1731 (7.5452)	-4.4805 (7.6693)	-4.2497 (7.5056)					-4.8955 (7.6131)	-4.9568 (0.0206)
	LLP/total Assets								-0.3353 (0.8328)			
	loan / total Assets									-0.6221 (0.8374)		
Leverage	Long term liability/total equity	1.7983 (4.5464)	1.8148 (4.5287)	1.7983 (4.5068)	1.5360 (3.7255)	1.5411 (4.1986)	2.4059 (3.9735)	1.9479 (3.1611)	-0.3545 ** (0.1612)	2.8007 (0.5249)		1.3888 (0.0123)
	Total debt/total Assets										0.1638 (0.5139)	
Operational efficiency (Mget1)		0.6504 (2.4513)	0.6708 (2.4359)	0.6712 (2.42783)	0.7988 (2.4403)	0.5581 (2.3157)	0.4330 (2.0370)	0.5243 (1.9741)	-0.5102*** (0.0786)	0.5836 (0.7841)	0.8873 (2.3459)	-0.6468 (0.0069)
Staff expenses	Overheads/total expense	0.8852 (4.1724)	0.9534 (4.1109)	0.9663 (4.0926)	0.9981 (4.0921)	0.8243 (3.9829)	2.5106 (3.7434)	2.5567 (3.7243)	-0.0723 (0.1214)	2.6833 (0.4984)	0.8375 (4.1761)	
	Overheads/total Assets											72.4618 (0.1663)
Assets Utilisation (Assut1)		5.1231 (25.160)	5.6417 (24.618)	5.6346 (24.535)	5.8289 (24.571)	3.8449 (21.784)	-0.9168 (16.2233)	-0.9277 (16.173)	0.3951 (0.7372)	0.8674 (0.9614)	5.9269 (25.016)	-2.3986 (0.0670)
Profit and Loss Sharing (PLS)		5.0408* (2.9067)	5.2804*** (1.8811)	5.3070*** (1.8324)	5.2693*** (1.8300)	5.3207*** (1.8249)	4.5817*** (1.5105)	4.5530*** (1.4984)	0.2194** (0.1011)	3.9130 (0.1570)	4.9842* (2.9041)	5.0391 (0.0078)
Salam (SLM)		-0.9601 (12.119)	-0.8005 (11.9891)						-0.2900 (0.3551)	-0.8114 (0.9461)	-1.0075 (12.139)	-1.0705 (0.0326)
Non- Profit and Loss Sharing (Murab)		-0.3363 (3.101733)							0.1233 (0.101884)	-0.8746 (0.7772)	-0.4264 (3.1043)	-0.0474 (0.0083)
R ^{2} Adjusted R^2		0.0087	0.0153	0.0219	0.0221	0.0283	0.020204	0.0262	0.5319	-0.0041		0.0177

* Numbers without brackets are the coefficients and numbers in brackets are the standard deviations. *, **and *** indicate significance levels of 10%, 5% and 1% respectively.